

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MCPC1AN
Type: ON/OFF TELECOMMAND
Function: Primary Converter 1 to A (N)
Description: Switches Primary Converter 1 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: NONE
RESET: K1,K1-5,K1-8

Mnemonic: MCPC1BN
Type: ON/OFF TELECOMMAND
Function: Primary Converter 1 to B (N)
Description: Switches Primary Converter 1 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: K1;
RESET: K1-5,K1-8

Mnemonic: MCRC1AN
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 1 to A (N)
Description: Switches Redundant Converter 1 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: K1-5,K1-8
RESET K2

Mnemonic: MCRC1BN
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 1 to B (N)
Description: Switches Redundant Converter 1 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: K2,K1-5,K1-8
RESET: NONE

Mnemonic: MCPC2AN
Type: ON/OFF TELECOMMAND
Function: Primary Converter 2 to A (N)
Description: Switches Primary Converter 2 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: NONE
RESET: K3,K1-4,K1-7

Mnemonic: MCPC2BN
Type: ON/OFF TELECOMMAND
Function: Primary Converter 2 to B (N)
Description: Switches Primary Converter 2 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effectuated:
SET: K3
RESET: K1-4,K1-7

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MCRC2AN
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 2 to A (N)
Description: Switches Redundant Converter 2 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K1-4,K1-7
RESET: K3

Mnemonic: MCRC2BN
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 2 to B (N)
Description: Switches Redundant Converter 2 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effected:
SET: NONE
RESET: K3,K1-4,K1-7

Mnemonic: MCDPONN
Type: ON/OFF TELECOMMAND
Function: DEP Power ON (N)
Description: Switches on Power to the DEP.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K2-1
RESET: NONE

Mnemonic: MCALLONN
Type: ON/OFF TELECOMMAND
Function: All ON Normal Mode (N)
Description: Switches on all MDI systems in Normal (DEP) mode.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-1,K1-2,K2-1 -> K2-6,K3-1 -> K3-6,K17,K18
RESET: NONE

Mnemonic: MCDSONN
Type: ON/OFF TELECOMMAND
Function: All ON DSOS Mode (N)
Description: Switches on all MDI systems in Backup (DSOS) mode.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-1,K1-3,K2-3,K3-6,K17,K18
RESET: K1-2,K1-6

Mnemonic: MCTMSELN
Type: ON/OFF TELECOMMAND
Function: Redundant High Rate TLM (N)
Description: Selects the redundant high rate telemetry interface.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-6
RESET: NONE

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Mnemonic: MCALLOFN
Type: ON/OFF TELECOMMAND
Function: All MDI Systems Off (N)
Description: Switches all MDI systems off
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: NONE
RESET: K1-1 -> K1-3,K2-1 -> K2-6,K3-1 -> K3-6, K17,K18,K29,K30

Mnemonic: MCDPRSTN
Type: ON/OFF TELECOMMAND
Function: DEP RESET (N)
Description: Issues a reset to the DEP
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCDSRSTN
Type: ON/OFF TELECOMMAND
Function: DSOS RESET (N)
Description: Issues a reset to the DSOS
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCSPAREN
Type: ON/OFF TELECOMMAND
Function: MDI Pulse Command 16 (N)
Description: UNUSED normal pulse command.
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCTCMLN
Type: ON/OFF TELECOMMAND
Function: Change TC Memory Load (N)
Description: Switches DEP to redundant telecommand and telemetry interface.
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCPC1AR
Type: ON/OFF TELECOMMAND
Function: Primary Converter 1 to A (R)
Description: Switches Primary Converter 1 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effected:
SET: NONE
RESET: K1,K1-5,K1-8

Mnemonic: MCPC1BR
Type: ON/OFF TELECOMMAND
Function: Primary Converter 1 to B (R)
Description: Switches Primary Converter 1 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K1;
RESET: K1-5,K1-8

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Mnemonic: MCRC1AR
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 1 to A (R)
Description: Switches Redundant Converter 1 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K1-5,K1-8
RESET K2

Mnemonic: MCRC1BR
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 1 to B (R)
Description: Switches Redundant Converter 1 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K2,K1-5,K1-8
RESET: NONE

Mnemonic: MCPC2AR
Type: ON/OFF TELECOMMAND
Function: Primary Converter 2 to A (R)
Description: Switches Primary Converter 2 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effected:
SET: NONE
RESET: K3,K1-4,K1-7

Mnemonic: MCPC2BR
Type: ON/OFF TELECOMMAND
Function: Primary Converter 2 to B (R)
Description: Switches Primary Converter 2 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K3
RESET: K1-4,K1-7

Mnemonic: MCRC2AR
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 2 to A (R)
Description: Switches Redundant Converter 2 to Spacecraft Bus A.
This command does not require MDI power be on.
Power System Relays Effected:
SET: K1-4,K1-7
RESET: K3

Mnemonic: MCRC2BR
Type: ON/OFF TELECOMMAND
Function: Redundant Converter 2 to B (R)
Description: Switches Redundant Converter 2 to Spacecraft Bus B.
This command does not require MDI power be on.
Power System Relays Effected:
SET: NONE
RESET: K3,K1-4,K1-7

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MCDPONR
Type: ON/OFF TELECOMMAND
Function: DEP Power ON (R)
Description: Switches on Power to the DEP.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K2-1
RESET: NONE

Mnemonic: MCALLONR
Type: ON/OFF TELECOMMAND
Function: All ON Normal Mode (R)
Description: Switches on all MDI systems in Normal (DEP) mode.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-1,K1-2,K2-1 -> K2-6,K3-1 -> K3-6,K17,K18
RESET: NONE

Mnemonic: MCDSONR
Type: ON/OFF TELECOMMAND
Function: All ON DSOS Mode (R)
Description: Switches on all MDI systems in Backup (DSOS) mode.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-1,K1-3,K2-3,K3-6,K17,K18
RESET: K1-2,K1-6

Mnemonic: MCTMSELR
Type: ON/OFF TELECOMMAND
Function: Redundant High Rate TLM (R)
Description: Selects the redundant high rate telemetry interface.
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: K1-6
RESET: NONE

Mnemonic: MCALLOFR
Type: ON/OFF TELECOMMAND
Function: All MDI Systems Off (R)
Description: Switches all MDI systems off
Spacecraft Power to MDI must be on for this command to function.
Power System Relays Effected:
SET: NONE
RESET: K1-1 -> K1-3,K2-1 -> K2-6,K3-1 -> K3-6, K17,K18,K29,K30

Mnemonic: MCDPRSTR
Type: ON/OFF TELECOMMAND
Function: DEP RESET (R)
Description: Issues a reset to the DEP
Spacecraft Power to MDI must be on for this command to function.

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Mnemonic: MCDSRSTR
Type: ON/OFF TELECOMMAND
Function: DSOS RESET (R)
Description: Issues a reset to the DSOS
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCSPARER
Type: ON/OFF TELECOMMAND
Function: MDI Pulse Command 16 (R)
Description: UNUSED normal pulse command.
Spacecraft Power to MDI must be on for this command to function.

Mnemonic: MCTCMLR
Type: ON/OFF TELECOMMAND
Function: Change TC Memory Load (R)
Description: Switches DEP to redundant telecommand and telemetry interface.
Spacecraft Power to MDI must be on for this command to function.

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Mnemonic: MBDUMMY
Type: BLOCK TELECOMMAND
Function: Nop BLock Command
Parameters: ID: 00 Length: 2 Fixed Words: None
Description: The NOP Command executes no function in the DEP. It is normally used to verify the block command interface. The mnemonic is defined by MMS-F and is included in MDI database for compatibility with MMS

Mnemonic: MBOBT
Type: BLOCK TELECOMMAND
Function: OBT at Next Major Frame
Parameters: ID: 01 Length: 5 Fixed Words: None
Description: This command contains the spacecraft on-board time at the next major frame. Defined by MMS-F and is included in MDI database for compatibility with MMS. In the EGSE, time synchronization is only approximate as the EGSE does not either a highly accurate time reference or the major frame pulse.

Mnemonic: MBFLEX
Type: BLOCK TELECOMMAND
Function: Flexible Bit Rate Format
Parameters: ID: 02 Length: 3 Fixed Words: None
Description: The command is used to switch experiments to flexible format rates. It is not used by MDI. Defined by MMS-F and is included in MDI database for compatibility with MMS

Mnemonic: MBHRMAG
Type: BLOCK TELECOMMAND
Function: Magnetogram Mode
Parameters: ID: 03 Length: 3 Fixed Words: 0001
Description: MDI High Rate Data Channel to Magnetogram Mode

Mnemonic: MBHRHEL
Type: BLOCK TELECOMMAND
Function: Helioseismology Mode
Parameters: ID: 03 Length: 3 Fixed Words: 0002
Description: MDI High Rate Data Channel to Helioseismology Mode

Mnemonic: MBIIMODE
Type: BLOCK TELECOMMAND
Function: Intra-Instrument Mode
Parameters: ID: 04 Length: 3 Fixed Words: None
Description: Intra_instrument Mode
Defined by MMS-F
Included in MDI database for EGSE Compatibility
Receive and standby mode only valid for MDI

Mnemonic: MBESR
Type: BLOCK TELECOMMAND
Function: Emergency Sun Acquisition
Parameters: ID: 05 Length: 3 Fixed Words: CCCC
Description: ESR Command
Defined by MMS-F
Included in MDI database for EGSE Compatibility

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Mnemonic: MBIIDATA
Type: BLOCK TELECOMMAND
Function: Receive Intra-Instrument Data
Parameters: ID: 06 Length: 4 Fixed Words: None
Description: Intra-Instrument Data Exchange
Defined by MMS-F
Included in MDI database for EGSE Compatibility

Mnemonic: MBIIRST
Type: BLOCK TELECOMMAND
Function: Intra-Instrument Reset
Parameters: ID: 07 Length: 3 Fixed Words: FFFF
Description: Intra-Instrument Reset
Defined by MMS-F
Included in MDI database for EGSE Compatibility

Mnemonic: MBHWCNFR
Type: BLOCK TELECOMMAND
Function: Set DEP Configuration Reg.
Parameters: ID: 08 Length: 3 Fixed Words: None
Description: The DEP Configuration Register controls several aspects of DEP operations. The command is decoded by hardware, so configuration bits can be set with the DEP not running. Bit definitions are:
Bit 0: enable spacecraft load
Bit 1: enable RS232
Bit 2: Disable WatchDog
Bit 3: Memory Error (status)
Bit 4: selected alternat PROM bank
Bit 5: Enable Error Correction
Bit 6: Switch RAM Banks
Bit 7: Cold/Warm Boot (status)

Mnemonic: MBDPMOD
Type: BLOCK TELECOMMAND
Function: Set DEP Operating Mode
Parameters: ID: 09 Length: 3 Fixed Words: None
Description: This command determines DEP operating/telemetry mode. A command parameter specifies one of the following modes:
0: IDLE
1: INITIALIZE
2: LOAD/DUMP
3: SEQUENCE
4: LIMB TRACKER
5: NO IP
6: DEVICE CHARACTERIZATION
NOTE: This command has not been implemented and the function of this telecommand may change.

Mnemonic: MBDPML
Type: BLOCK TELECOMMAND
Function: DEP Generalized Load Command
Parameters: ID: 0A Length: Variable Fixed Words: None
Description: This command loads up to 28 words into DEP memory. Load addresses are in 8086 format, i.e. segment and offset. The first command parameter
Mnemonic: MBDPML <CONTINUED>

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is segment and the second is offset. The length of the load is determined from the length of the command.

NOTE: This command functions both in normal DEP operating mode and in spacecraft monitor mode; thus, the DEP code loaded using spacecraft commands by setting configuration bit 0, resetting the DEP, then using this command.

Mnemonic: MBDSML
Type: BLOCK TELECOMMAND
Function: DSOS Generalized Load Command
Parameters: ID: 0A Length: Variable Fixed Words: None
Description: This command loads up to 28 words into DSOS memory. Load addresses are in 8086 format, i.e. segment and offset. The first command parameter is segment and the second is offset. The length of the load is determined from the length of the command.
NOTE: This command functions is identical to the DEP memory load command. In the DSOS case, segment is ignored.

Mnemonic: MBDPMD
Type: BLOCK TELECOMMAND
Function: DEP Memory Dump
Parameters: ID: 0B Length: 5 Fixed Words: None
Description: Dump (a portion) DEP memory using 5KB Science Channel. Dump addresses in in 8086 format, i.e. segment and offset. The first parameter is segment, next is Offset, and the third is length of the dump in bytes. DEP automatically switches to dump mode. Dump data replaces science data.
NOTE: This command functions both in normal DEP operating mode and in spacecraft monitor mode; thus, one can dump DEP memory prior to commanding the DEP to normal operations.

Mnemonic: MBDSMD
Type: BLOCK TELECOMMAND
Function: DSOS Memory Dump
Parameters: ID: 0B Length: 4 Fixed Words: None
Description: Dump (a portion) DSOS memory using 5KB Science Channel. Dump addresses in in 8086 format, i.e. segment and offset. The first parameter is segment, next is Offset. Segment is ignored. The DSOS begins the dump at the specified address and continues forever, wrapping around to low addresses after the top of memory has been reached.

Mnemonic: MBDPEPRM
Type: BLOCK TELECOMMAND
Function: Reprogram EEPROM
Parameters: ID: 0C Length: 7 Fixed Words: None
Description: The EEPROM requires additional power; so, the load concept is that one First uses MBDPML to load EEPROM patches to a scratch area in RAM then uses this command to transfer the patch to EEPROM. Command parameters are ,in order, RAM segment, Ram offset, EEPROM segment, EEPROM offset, length in words.

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Mnemonic:	MBIPLBIC
Type:	BLOCK TELECOMMAND
Function:	Load IP Built-in Code
Parameters:	ID: 0D Length: 5 Fixed Words: 00
Description:	<p>This command transfers one of the built-in IP programs from the DEP to Writable Control Store (WCS). The first parameter contains IP Major and minor version numbers in the high and low byte respectively. The second parameters is the index of the built-in load. Built-ins are:</p> <p>0: pack4x4b.... 5 filtergrams from memories 0-4 summed 4x4. 1: extr128a... extract central 128x128 from memory 0. 2: buftest1 ... test 5KB telemetry buffer. 3: extr1024 ... extract standard 1024x1024 filtergram from memory 0. 4: extr256a... extract central 256x256 from memory 0. 5: pack4x4c ... 4x4 sum of single image from memory 0. 6: flt_tst The test version of the flight firmware.</p>
Mnemonic:	MBIPLWCS
Type:	BLOCK TELECOMMAND
Function:	Load IP Writable Control Store
Parameters:	ID: 0D Length: Variable Fixed Words: 01
Description:	<p>This command transfers data from DEP memory to the Image Processor's Writable Control Store (WCS). 1 to 6 "columns" of coded IP firmware is transferred by the command. Parameters are: IP Version; DEP segment; DEP Offset; Length of column 0 common word block (words); Length of column 0 data (bytes); Up to 5 more such length pairs. The IP address is contained in the IPload blocks. Non-contiguous columns can be loaded using 0 for block lengths. The common word block is a list of up to 32 words that occur most often in the column. Column data coding is described in MDI340021. Data is either the initial IP load from EEPROM, or IP patches loaded to RAM via MBDPML. The IP cannot be running while being loaded.</p>
Mnemonic:	MBIPCMD
Type:	BLOCK TELECOMMAND
Function:	Issues a Command to the IP
Parameters:	ID: 0E Length: Variable Fixed Words: None
Description:	<p>This command allows the DEP to interact with the IP at a primitive level. The first word specifies the interaction. It commands 3 fields: Code (bits 0-2); Mask (bits 3-7); Function (bits 8-15). Codes are: 0: Inst/Data Reg; 1: Inst Queue; 2: 32K Buffer; 3: Control Store; 4: Error Status/Aux Reg; 5: Enable/Disable Interrupts (with data bit 0) 6: Function (with data bits 0-7); 7: Returns IPIS,AXIS14:Axis0. Mask bits: 4(AD): Signifies address in IP block; 5(IN): enable input; 6(TS): pre-input(IN) or pre-output(OT) check, end transfer if not ready; 7(OT): enables output transfers. Additional parameters depend on first. Second parameter is address if AD is set or number of words if IN is set, or the first of up to 28 output words if OT is set.</p>
Mnemonic:	MBIPRSAL
Type:	BLOCK TELECOMMAND
Function:	IP Reset All
Parameters:	ID: 0E Length: 3 Fixed Words: 4006
Description:	<p>This command resets the IP hardware. This is a full reset of the APU, main memory DMA controllers, and the telemetry interface.</p>
Mnemonic:	MBIPRSAL <CONTINUED>

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This is a special case of the general purpose IP command.

Mnemonic: MBIPRSAP
 Type: BLOCK TELECOMMAND
 Function: IP Reset APU and DMA
 Parameters: ID: 0E Length: 3 Fixed Words: 0006
 Description: This command resets the APU and the main memory DMA controllers.
 This is a special case of the general purpose IP command.

Mnemonic: MBIPINIT
 Type: BLOCK TELECOMMAND
 Function: IP Initialize APU
 Parameters: ID: 0E Length: 3 Fixed Words: C006
 Description: This command resets the APU.
 This is a special case of the general purpose IP command.

Mnemonic: MBIPRUN
 Type: BLOCK TELECOMMAND
 Function: Set IP to RUN
 Parameters: ID: 0E Length: 3 Fixed Words: 8006
 Description: This command sets the IP firmware to RUN.
 This is a special case of the general purpose IP command.

Mnemonic: MBIPTBL
 Type: BLOCK TELECOMMAND
 Function: Generate/Load IP table
 Parameters: ID: 0F Length: Variable Fixed Words: None
 Description: Load an IP lookup table
 The first word identifies the table. The next three words define the IP add
 11 Tables have been currently identified. These are:
 Inverse, Remap Sine, Remap Cosine,
 FFT Sine, FFT Cosine, Intensity SQRT, Compression SQRT
 Velocity Lookup, Limb figure, LOI, and SunCenter.

Mnemonic: MBIPBKLD
 Type: BLOCK TELECOMMAND
 Function: IP Block Load
 Parameters: ID: 10 Length: Variable Fixed Words: None
 Description: Load a block of data to IP main Memory
 The first word of the command indicates sub-command. Sub-commands are:
 Start Block, Data Block, End Block, and Transfer Block
 Additional Mnemonics may be defined for the sub-commands

Mnemonic: MBIPMACL
 Type: BLOCK TELECOMMAND
 Function: IP Macro Load
 Parameters: ID: 11 Length: Variable Fixed Words: None
 Description: This command loads instructions and data into the Image Processor
 Instruction Queue (IQ). The first parameter is the queue address. Up
 to 29 additional parameters define data to be loaded. The DEP
 must disable IP access to the IQ prior to loading. Since IP and the
 DEP are executing asynchronously, the DEP must "wait" for the IP to
 acknowledge that the queue is available to the DEP. The DEP then loads

Mnemonic: MBIPMACL <CONTINUED>
 the specified command bytes into the queue and grant queue access to

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the IP. Loading of the queue may, therefore, be somewhat delayed. To allow a fairly transparent user interface, the DEP can stack a number of IP load blocks while waiting for the IP to release the queue.

Mnemonic:	MBIPDMPL
Type:	BLOCK TELECOMMAND
Function:	IP Memory Dump (Low Rate)
Parameters:	ID: 12 Length: 8 Fixed Words: 00
Description:	Dump a section of IP memory on the 5KB science channel. The first 3 parameters define the (22 bit) IP address, and 2 words define length. The dump data replaces 5KB science data.
Mnemonic:	MBIPDMPH
Type:	BLOCK TELECOMMAND
Function:	IP Memory Dump (High Rate)
Parameters:	ID: 12 Length: 8 Fixed Words: 01
Description:	Dump a section of IP memory on the 160KB science channel. The first 3 parameters define the (22 bit) IP address, and 2 words define length. Dump data replaces normal high rate science data.
Mnemonic:	MBIPRDDR
Type:	BLOCK TELECOMMAND
Function:	Read/Dump IP Data Register
Parameters:	ID: 12 Length: 4 Fixed Words: 02
Description:	Read IP data register and dumps to 5 KB telemetry. A parameter specifies the number of words to read. DEP goes into IP dump mode until all data words have been read and dumped. This command is used for diagnostic purposes only.
Mnemonic:	MBIPLDAR
Type:	BLOCK TELECOMMAND
Function:	Load the IP Aux Register
Parameters:	ID: 12 Length: 4 Fixed Words: 03
Description:	Write the specified value to the IP aux Register. There is currently no defined use for the Aux.
Mnemonic:	MBIPLDIN
Type:	BLOCK TELECOMMAND
Function:	Load IP Instruction
Parameters:	ID: 12 Length: Variable Fixed Words: 04
Description:	This command is used to execute Image Processor instructions directly from the DEP via telecommand rather than from the instruction queue. It is primarily used for debugging. An IP instruction and up to 28 instruction operands can be specified in the parameter list.
Mnemonic:	MBCMALIC
Type:	BLOCK TELECOMMAND
Function:	Load Integrate Command
Parameters:	ID: 13 Length: 4 Fixed Words: 00
Description:	Load the specified integrate command to the interface buffer. The camera is unaffected by this command. MBCMASIC (or MBCMASIR followed by a shutter command) is required for the specified integrate command
Mnemonic:	MBCMALIC <CONTINUED>
	to be send from the interface to the camera electronics. This command and all other command in the type 13 group are primitive

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camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMALRC
Type: BLOCK TELECOMMAND
Function: Load Readout Command
Parameters: ID: 13 Length: 4 Fixed Words: 01
Description: Load the specified readout command to the interface buffer. The camera is unaffected by this command. MBCMASRC (or MBCMASIR followed by a shutter command) is required for the specified readout command to be send from the interface to the camera electronics.
This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMALBC
Type: BLOCK TELECOMMAND
Function: Load Buffer Counter
Parameters: ID: 13 Length: 4 Fixed Words: 02
Description: Load the CCD interface buffer counter. This command will be followed by one or more MBCMALBD commands to load the buffer or by MBCMASBD to send buffer data to the camera. The interface receives or transmits until bit eight of the address goes high. Since a header or map load is 129 bytes long, valid addresses for normal operations are 127, 639, 1151, and 1663.
This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMALBD
Type: BLOCK TELECOMMAND
Function: Load Buffer Data
Parameters: ID: 13 Length: Variable Fixed Words: 03
Description: Load CCD interface buffer data. The number of words loaded is determined by the block length. This command is preceeded by MBCMALBC. A number of these commands may be sent to load more than 29 words. Intervening MBCMALBC command are not requires. MBCMASBD transfers the buffer data from the interface to the camera. Buffer data may be camera header data or long word maps. For normal camera operations, loads are 129 bytes long: 1 byte for camera command and 128 data bytes. This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

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Mnemonic: MBCMASIC
Type: BLOCK TELECOMMAND
Function: Send Integrate Comamnd
Parameters: ID: 13 Length: 3 Fixed Words: 04
Description: Send the command stored in the interface integrate command buffer to the camera. MBCMALIC stores the command in the interface. This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMASRC
Type: BLOCK TELECOMMAND
Function: Send Readout Command
Parameters: ID: 13 Length: 3 Fixed Words: 05
Description: Send the command stored in the interface readout command buffer to the camera. MBCMALRC stores the command in the interface. This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMASIR
Type: BLOCK TELECOMMAND
Function: Send Sync Int and R/O
Parameters: ID: 13 Length: 3 Fixed Words: 06
Description: Set the camera interface to shutter control mode. In this mode, the interface transfers previously loaded integrate and readout commands to the camera as a function of the open out signal from the shutter. The shutter must be in the recock position prior to sending this command. This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMASBD
Type: BLOCK TELECOMMAND
Function: Send Buffer Data
Parameters: ID: 13 Length: 3 Fixed Words: 07
Description: Send buffer data from the interface to the camera. This command must be preceeded by MBCMALBC to set the buffer address. This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMACLF
Type: BLOCK TELECOMMAND
Function: Clear Flags
Parameters: ID: 13 Length: 3 Fixed Words: 08
Description: Clears camera interface flags. This command sets the interface to a ready condition. Busy, buffer full, and comera done flags are all set to nominal conditions. after this command the interface should be

Mnemonic: MBCMACLF <CONTINUED>

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ready to start any new operation.

This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMINIT
Type: BLOCK TELECOMMAND
Function: Initialize Interface
Parameters: ID: 13 Length: 3 Fixed Words: 09
Description: Initialize the camera interface.

Mnemonic: MBCMAINT
Type: BLOCK TELECOMMAND
Function: Select A Interface
Parameters: ID: 13 Length: 4 Fixed Words: 0B 00
Description: The DEP camera interface is fully redundant. This command selects the A side electronics.
This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMBINT
Type: BLOCK TELECOMMAND
Function: Select B Interface
Parameters: ID: 13 Length: 4 Fixed Words: 0B 01
Description: The DEP camera interface is fully redundant. This command selects the B side electronics.
This command and all other command in the type 13 group are primitive camera commands that are used only for trouble shooting. Type 14 commands, and even more so DEP sequences, are normally used to operate the camera.
commands, and even more so DEP sequences, are normally used to operate the camera.

Mnemonic: MBCMAADC
Type: BLOCK TELECOMMAND
Function: Select A Preamp & Set ADC Level
Parameters: ID: 14 Length: 4 Fixed Words: 00
Description: The camera can be read out from either of 2 sets of output electronics. This command selects the A side.
Each set sends the camera data to a single analog to digital converter (ADC). The ADC has an adjustable offset. The parameter That accompanies this command sets the level. The ACD level for nominal A side operations is 6.

Mnemonic: MBCMBADC
Type: BLOCK TELECOMMAND
Function: Select B Preamp & Set ADC Level
Parameters: ID: 14 Length: 4 Fixed Words: 01
Description: The camera can be read out from either of 2 sets of output electronics. This command selects the B side.
Mnemonic: MBCMBADC <CONTINUED>
Each set sends the camera data to a single analog to digital

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converter (ADC). The ADC has an adjustable offset. The parameter That accompanies this command sets the level. The ACD level for nominal B side operations is 6.

Mnemonic:	MBCMRES
Type:	BLOCK TELECOMMAND
Function:	Reset Camera
Parameters:	ID: 14 Length: 3 Fixed Words: 02
Description:	Reset the camera and the camera interface.
Mnemonic:	MBCMSUMM
Type:	BLOCK TELECOMMAND
Function:	Set Summing Mode
Parameters:	ID: 14 Length: 5 Fixed Words: 03
Description:	Set the camera summing mode. The first parameter sets the serial mode while the second sets the parallel summing mode. If the mode is other than 1 1, the DEP sends long word maps to the camera to realize the parallel summing request.
Mnemonic:	MBCMSUBR
Type:	BLOCK TELECOMMAND
Function:	Set Subregion
Parameters:	ID: 14 Length: 5 Fixed Words: 04
Description:	This command is used to select a contiguous sub-array for readout. The parameters are start and end rows. From these parameters, the DEP constructs and loads camera maps. This feature works only in 1x1 summing mode.
Mnemonic:	MBCMHDR1
Type:	BLOCK TELECOMMAND
Function:	Load/Send Data to Header 1
Parameters:	ID: 14 Length: Variable Fixed Words: 05
Description:	Send 10 bytes to the first 10 bytes of header words 1. The lower eight of each specified parameter are sent. These 10 bytes control the operation of the Image Processor DMA controllers and pass a signal to either the high rate telemetry interface or the Image Processor APU.
Mnemonic:	MBCMHDR2
Type:	BLOCK TELECOMMAND
Function:	Load/Send Data to Header 2
Parameters:	ID: 14 Length: Variable Fixed Words: 06
Description:	Send data bytes to header word 2. The number of bytes to be sent is determined by the command length. Header word 2 data is normally used for image annotation.
Mnemonic:	MBCMTP1
Type:	BLOCK TELECOMMAND
Function:	Take a 1X picture
Parameters:	ID: 14 Length: 6 Fixed Words: 07
Description:	This command stages all the primitive camera and shutter activities needed to take a full disk image. First the shutter is cocked to the 1X position. Headers are sent to the camera. The integrate and
Mnemonic:	MBCMTP1 <CONTINUED>
	readout commands are sent to the camera interface and the interface is set to shutter control mode. The high and low bytes of the exposure

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are sent to the shutter and the shutter is commanded to take a 1X exposure. The 32 bits defined by the first 2 parameters are put in the sequence identifier section of header 1 prior to sending the header to the camera. The third parameter is the exposure time (each bit = 2.5 milliseconds).

Mnemonic:	MBCMTP3
Type:	BLOCK TELECOMMAND
Function:	Take a 3X Picture
Parameters:	ID: 14 Length: 6 Fixed Words: 08
Description:	This command stages all the primitive camera and shutter activities needed to take a hi-resolution image. First the shutter is cocked to the 3X position. Headers are sent to the camera. The integrate and readout commands are sent to the camera interface and the interface is set to shutter control mode. The high and low bytes of the exposure are sent to the shutter and the shutter is commanded to take a 3X exposure. The 32 bits defined by the first 2 parameters are put in the sequence identifier section of header 1 prior to sending the header to the camera. The third parameter is the exposure time (each bit = 2.5 milliseconds).
Mnemonic:	MBCMDRK
Type:	BLOCK TELECOMMAND
Function:	1X Dark Frame
Parameters:	ID: 14 Length: 6 Fixed Words: 09
Description:	Takes an image without opening the shutter. The DEP sends headers to the camera, then sends integrate and readout commands to the interface. The DEP commands the interface to send the integrate command to the camera and loads a timer with the requested exposure time. When the timer has timed out, the DEP commands the interface to send the readout command to the camera. The shutter must be closed prior to this command. The 32 bits defined by the first 2 parameters are placed in the sequence identifier section of header 1 prior to sending the header to the camera. The third parameter is the exposure time (each bit = .25 milliseconds).
Mnemonic:	MBCMTP1R
Type:	BLOCK TELECOMMAND
Function:	Take a 1X picture & Set Ref Time
Parameters:	ID: 14 Length: 6 Fixed Words: 17
Description:	Same as MBCMTP1 except reference time operations occur.
Mnemonic:	MBCMTP3R
Type:	BLOCK TELECOMMAND
Function:	Take a 3X Picture & Set Ref Time
Parameters:	ID: 14 Length: 6 Fixed Words: 18
Description:	Same as MBCMTP3 except reference time operations occur.

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Mnemonic: MBCMDRKR
Type: BLOCK TELECOMMAND
Function: 1X Dark Frame & Set Ref Time
Parameters: ID: 14 Length: 6 Fixed Words: 19
Description: Same as MBCMDRK except reference time operations occur.

Mnemonic: MBDMCMD
Type: BLOCK TELECOMMAND
Function: DMC Command
Parameters: ID: 15 Length: 4 Fixed Words: 00
Description: This command issues a single primitive command to the DMC. A parameter defines the DMC command. This command replaces MBDMSTEP which will be removed in some future release of the database.
DMC commands are somewhat convoluted and some day a document radiating the glow of DMC truth will materialize, perhaps from the suchness of the DMC itself.

Mnemonic: MBDMRLY
Type: BLOCK TELECOMMAND
Function: DMC Relay Command
Parameters: ID: 15 Length: 4 Fixed Words: 01
Description: This command issues a single DMC relay switching command. A single relay switch happens with each command. The relay switch codes are:
1: MTM1 Normal; 2: MTM1 DMC; 3: MTM2 Normal; 4: MTM2 DMC
5: PA Normal; 6: PA DMC; 7: Shutter Normal; 8: Shutter DMC
9: C1 Normal; 10: C1 DMC; 11: C2 Normal; 12: C2 DMC; 13: FD2 Normal;
14: FD2 DMC; 15: FD1 Normal; 16: FD1 DMC; 17: AM2 Normal;
18: AM2 DMC; 19: AM1 Normal; 20: AM1 DMC

Mnemonic: MBDMMOV
Type: BLOCK TELECOMMAND
Function: Move Device with DMC
Parameters: ID: 15 Length: 8 Fixed Words: 02
Description: This command sends a series of step command to a DMC controller. The command parameters are as follows: Controller; Direction; Starting Position; Number of Steps; Delay between Steps.
Controller 1 moves MTM1, MTM2, or PA. Controller 2 moves Shutter, C1, C2, or FD2. Controller 3 moves FD1, AM2, or AM1. Which device is moved by a given controller depends on the relay selects done by MBDMRLY. Direction is 0 if steps are issued in increasing order and 1 if in decreasing order. Starting step is a number from 1 to 6 and will be the first step command issued by the DEP.
The DEP issues a coast for 2 ms prior to starting a move. Sequential steps are issued by the DEP until the operation is complete.

Mnemonic: MBDMSHRS
Type: BLOCK TELECOMMAND
Function: Shutter Reset with DMC
Parameters: ID: 15 Length: Variable Fixed Words: 03
Description: This command sends the shutter to a recock position. The 3 optional parameters are the start position and number of steps, and delay between steps.
Command length is variable. Unspecified parameters use the values set by MBDMEXPD.

Mnemonic: MBDMSHRS <CONTINUED>

MDI TELECOMMAND DESCRIPTIONS

The shutter is always moved toward increasing step numbers.

Mnemonic: MBDMEXP
Type: BLOCK TELECOMMAND
Function: Shutter Exposure Cycle with DMC
Parameters: ID: 15 Length: Variable Fixed Words: 04
Description: This command executes a shutter exposure cycle using the DMC. The parameters are: Exposure time; Open start position; number of open steps; close start position; number of close steps; delay between steps.

Mnemonic: MBDMEXPD
Type: BLOCK TELECOMMAND
Function: Set DMC Exposure Defaults
Parameters: ID: 15 Length: Variable Fixed Words: 05
Description: This command sets the default value for DMC shutter commands. The parameters are: Exposure time; Open start position; number of open steps; close start position; number of close steps; delay between steps, Recoil start position, and number of recoil steps. Command length is variable. Unspecified parameters are unchanged.

Mnemonic: MBDMTAP
Type: BLOCK TELECOMMAND
Function: Take a Picture with DMC
Parameters: ID: 15 Length: 6 Fixed Words: 06
Description: This command takes a picture using the DMC. The 32 bits defined by the first 2 parameters are put in the sequence identifier section of header 1 prior to sending the header to the camera. The third parameter is the exposure time (each bit = 2.5 milliseconds). Parameters set by MBDMEXPD are used to control the operation of the shutter by the DMC.

Mnemonic: MBDPFLGS
Type: BLOCK TELECOMMAND
Function: Set DEP Flags
Parameters: ID: 15 Length: 6 Fixed Words: 07
Description: This command sets bits in a specified DEP flag word. The first parameter is an index to the flags area; the second is a mask; the third is the value. The value is left shifted to map with the flag. For example, MBDPFLG 0 0x20 1 sets bit 5 of the first flag word to one.
{The flag of most interest now is the flag that controls whether or not the DEP adjusts clockwise motor moves by -1. Setting bit 5 of flag 0 to a 1 enables this feature while setting it to 0 disables the feature.

Mnemonic: MBM1NOP
Type: BLOCK TELECOMMAND
Function: MTM1 NOP
Parameters: ID: 16 Length: 3 Fixed Words: 00
Description: Send a NOP function to MTM1.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBM1CW
Type: BLOCK TELECOMMAND
Function: MTM1 Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 10
Description: Move MTM1 clockwise to position set by MBM1SP.

Mnemonic: MBM1RS
Type: BLOCK TELECOMMAND
Function: MTM1 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 20
Description: Reset the MTM1 controller. Encoder address goes to 255. This command must be set after power on prior to any other MTM1 commands.

Mnemonic: MBM1CCW
Type: BLOCK TELECOMMAND
Function: MTM1 Counter-Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 30
Description: Move MTM1 counter clockwise to position set by MBM1SP.

Mnemonic: MBM1SP
Type: BLOCK TELECOMMAND
Function: MTM1 Set Position
Parameters: ID: 16 Length: 4 Fixed Words: 40
Description: Set a position for the next MTM1 CW or CCW move.

Mnemonic: MBM2NOP
Type: BLOCK TELECOMMAND
Function: MTM2 NOP
Parameters: ID: 16 Length: 3 Fixed Words: 01
Description: Send a NOP function to MTM2.

Mnemonic: MBM2CW
Type: BLOCK TELECOMMAND
Function: MTM2 Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 11
Description: Move MTM2 Clockwise to position set by MBM2SP.

Mnemonic: MBM2RS
Type: BLOCK TELECOMMAND
Function: MTM2 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 21
Description: Reset the MTM2 controller. Encoder address goes to 255. This command must be set after power on prior to any other MTM2 commands.

Mnemonic: MBM2CCW
Type: BLOCK TELECOMMAND
Function: MTM2 Counter-Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 31
Description: Move MTM2 counter clockwise to position set by MBM2SP.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBM2SP
Type:	BLOCK TELECOMMAND
Function:	MTM2 Set Position
Parameters:	ID: 16 Length: 4 Fixed Words: 41
Description:	Set a position for the next MTM2 CW or CCW move.
Mnemonic:	MBPANOP
Type:	BLOCK TELECOMMAND
Function:	PA NOP
Parameters:	ID: 16 Length: 3 Fixed Words: 04
Description:	Send a NOP function to PA Wheel.
Mnemonic:	MBPACW
Type:	BLOCK TELECOMMAND
Function:	PA Clockwise
Parameters:	ID: 16 Length: 3 Fixed Words: 14
Description:	Move PA clockwise to position set by MBPASP.
Mnemonic:	MBPARS
Type:	BLOCK TELECOMMAND
Function:	PA Reset
Parameters:	ID: 16 Length: 3 Fixed Words: 24
Description:	Reset the PA controller. Encoder address goes to 255. This command must be set after power on prior to any other PA commands.
Mnemonic:	MBPACCW
Type:	BLOCK TELECOMMAND
Function:	PA Counter-Clockwise
Parameters:	ID: 16 Length: 3 Fixed Words: 34
Description:	Move PA counter clockwise to position set by MBPASP.
Mnemonic:	MBPASP
Type:	BLOCK TELECOMMAND
Function:	PA Set Position
Parameters:	ID: 16 Length: 4 Fixed Words: 44
Description:	Set a position for the next PA CW or CCW move.
Mnemonic:	MBC1NOP
Type:	BLOCK TELECOMMAND
Function:	C1 NOP
Parameters:	ID: 16 Length: 3 Fixed Words: 07
Description:	Send a NOP function to CAL1.
Mnemonic:	MBC1CW
Type:	BLOCK TELECOMMAND
Function:	C1 Clockwise
Parameters:	ID: 16 Length: 3 Fixed Words: 17
Description:	Move CAL1 clockwise to position set by MBC1SP.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBC1RS
Type: BLOCK TELECOMMAND
Function: C1 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 27
Description: Reset the CAL1 controller. Encoder address goes to 255. This command must be set after power on prior to any other CAL1 commands.

Mnemonic: MBC1CCW
Type: BLOCK TELECOMMAND
Function: C1 Counter-Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 37
Description: Move CAL1 counter clockwise to position set by MBC1SP.

Mnemonic: MBC1SP
Type: BLOCK TELECOMMAND
Function: C1 Set Position
Parameters: ID: 16 Length: 4 Fixed Words: 47
Description: Set a position for the next CAL1 CW or CCW move.

Mnemonic: MBC2NOP
Type: BLOCK TELECOMMAND
Function: C2 NOP
Parameters: ID: 16 Length: 3 Fixed Words: 08
Description: Send a NOP function to CAL2.

Mnemonic: MBC2CW
Type: BLOCK TELECOMMAND
Function: C2 Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 18
Description: Move CAL2 clockwise to position set by MBC2SP.

Mnemonic: MBC2RS
Type: BLOCK TELECOMMAND
Function: C2 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 28
Description: Reset the CAL2 controller. Encoder address goes to 255. This command must be set after power on prior to any other CAL2 commands.

Mnemonic: MBC2CCW
Type: BLOCK TELECOMMAND
Function: C2 Counter-Clockwise
Parameters: ID: 16 Length: 3 Fixed Words: 38
Description: Move CAL2 counter clockwise to position set by MBC2SP.

Mnemonic: MBC2SP
Type: BLOCK TELECOMMAND
Function: C2 Set Position
Parameters: ID: 16 Length: 4 Fixed Words: 48
Description: Set a position for the next CAL2 CW or CCW move.

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Mnemonic: MBFDNOP
Type: BLOCK TELECOMMAND
Function: Front Door NOP
Parameters: ID: 16 Length: 3 Fixed Words: 05
Description: Send a NOP to Front Door Motor Controller.

Mnemonic: MBFD1O
Type: BLOCK TELECOMMAND
Function: Front Open With Motor 1
Parameters: ID: 16 Length: 3 Fixed Words: 15
Description: Open the Front Door using Motor 1.

Mnemonic: MBFD2O
Type: BLOCK TELECOMMAND
Function: Front Door Open With Motor 2
Parameters: ID: 16 Length: 3 Fixed Words: 25
Description: Open the Front Door using Motor 2.

Mnemonic: MBFD1C
Type: BLOCK TELECOMMAND
Function: Front Door Close with Motor 1
Parameters: ID: 16 Length: 3 Fixed Words: 35
Description: Close the Front Door using Motor1. This works only if the door had been opened using Motor1.

Mnemonic: MBFD2C
Type: BLOCK TELECOMMAND
Function: Front Door Close with Motor 2
Parameters: ID: 16 Length: 3 Fixed Words: 45
Description: Close the Front Door using Motor2. This works only if the door had been opened using Motor2.

Mnemonic: MBFDBO
Type: BLOCK TELECOMMAND
Function: Front Door Open with Both
Parameters: ID: 16 Length: 3 Fixed Words: 55
Description: Open the Front Door using both Motors.

Mnemonic: MBFDBC
Type: BLOCK TELECOMMAND
Function: Front Door Close with Both
Parameters: ID: 16 Length: 3 Fixed Words: 65
Description: Close the Front Door using both Motors.

Mnemonic: MBFDRS
Type: BLOCK TELECOMMAND
Function: Front Door Reset
Parameters: ID: 16 Length: 3 Fixed Words: 75
Description: Send a reset to the Front Door. This should be sent prior to any other Front Door commands.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBSHNOP	
Type:	BLOCK TELECOMMAND	
Function:	Shutter NOP	
Parameters:	ID: 16 Length: 3	Fixed Words: 02
Description:	Send a NOP to the Shutter	
Mnemonic:	MBSH1X	
Type:	BLOCK TELECOMMAND	
Function:	Shutter 1X (Full Disk)	
Parameters:	ID: 16 Length: 3	Fixed Words: 12
Description:	The 1X command either sends the shutter to the 1X recock position, or takes a 1X exposure. The shutter action depends on the shutter state. If the shutter has been reset, or if the previous operation was an exposure (either 1X or 3X), the command sends the shutter to the 1X cocked position. If the previous commands was a recock, the command will take a 1X exposure. The exposure time is that set by the preceeding MBSHLB and MBSHHB.	
Mnemonic:	MBSHRS	
Type:	BLOCK TELECOMMAND	
Function:	Shutter Reset	
Parameters:	ID: 16 Length: 3	Fixed Words: 22
Description:	Send a reset to the Shutter. This should be sent after turn on before any other shutter commands are sent.	
Mnemonic:	MBSH3X	
Type:	BLOCK TELECOMMAND	
Function:	Shutter 3X (High Resolution)	
Parameters:	ID: 16 Length: 3	Fixed Words: 32
Description:	The 3X command either sends the shutter to the 3X recock position, or takes a 3X exposure. The shutter action depends on the shutter state. If the shutter has been reset, or if the previous operation was an exposure (either 1X or 3X), the command sends the shutter to the 3X cocked position. If the previous commands was a recock, the command will take a 3X exposure. The exposure time is that set by the preceeding MBSHLB and MBSHHB.	
Mnemonic:	MBSHLB	
Type:	BLOCK TELECOMMAND	
Function:	Shutter Load Low Byte	
Parameters:	ID: 16 Length: 4	Fixed Words: 42
Description:	The command loads the lower eight bits of the specified parameter into the shutter low byte. Since the shutter counter actually counts up to zero, the DEP complements the bits in the exposure time prior to sending the byte to the shutter.	
Mnemonic:	MBSHHB	
Type:	BLOCK TELECOMMAND	
Function:	Shutter Load High Byte	
Parameters:	ID: 16 Length: 4	Fixed Words: 52
Description:	The command loads the lower eight bits of the specified parameter into the shutter high byte. Since the shutter counter actually counts up to zero, the DEP complements the bits in the exposure time prior to sending the byte to the shutter.	

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBAM1NOP
Type: BLOCK TELECOMMAND
Function: AM1 NOP
Parameters: ID: 16 Length: 3 Fixed Words: 06
Description: Send a NOP to Alignment Mechanism 1.

Mnemonic: MBAM1INC
Type: BLOCK TELECOMMAND
Function: AM1 Increment
Parameters: ID: 16 Length: Variable Fixed Words: 16
Description: Increment Alignment Mechanism 1 by the number steps in the specified parameter or by 1 step if no parameter is specified.

Mnemonic: MBAM1DEC
Type: BLOCK TELECOMMAND
Function: AM1 Decrement
Parameters: ID: 16 Length: Variable Fixed Words: 26
Description: Decrement Alignment Mechanism 1 by the number steps in the specified parameter or by 1 step if no parameter is specified.

Mnemonic: MBAM1RS
Type: BLOCK TELECOMMAND
Function: AM1 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 36
Description: Reset Alignment Mechanism 1. This command should be sent prior to an immediately after switching alignment mechanism power on.

Mnemonic: MBAM2NOP
Type: BLOCK TELECOMMAND
Function: AM2 NOP
Parameters: ID: 16 Length: 3 Fixed Words: 46
Description: Send a NOP to Alignment Mechanism 2.

Mnemonic: MBAM2INC
Type: BLOCK TELECOMMAND
Function: AM2 Increment
Parameters: ID: 16 Length: Variable Fixed Words: 56
Description: Increment Alignment Mechanism 2 by the number steps in the specified parameter or by 1 step if no parameter is specified.

Mnemonic: MBAM2DEC
Type: BLOCK TELECOMMAND
Function: AM2 Decrement
Parameters: ID: 16 Length: Variable Fixed Words: 66
Description: Decrement Alignment Mechanism 2 by the number steps in the specified parameter or by 1 step if no parameter is specified.

Mnemonic: MBAM2RS
Type: BLOCK TELECOMMAND
Function: AM2 Reset
Parameters: ID: 16 Length: 3 Fixed Words: 76
Description: Reset Alignment Mechanism 2. This command should be sent prior to an immediately after switching alignment mechanism power on.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBPWAEON
Type:	BLOCK TELECOMMAND
Function:	Applications Electronics On
Parameters:	ID: 17 Length: 3 Fixed Words: 15
Description:	The DEP switches power to the Applications Electronics On. The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Applications Electronics is already on to remove the DEP filter.
Mnemonic:	MBPWAEOF
Type:	BLOCK TELECOMMAND
Function:	Applications Electronics Off
Parameters:	ID: 17 Length: 3 Fixed Words: 16
Description:	The DEP switches power to the Applications Electronics Off.
Mnemonic:	MBPWHPON
Type:	BLOCK TELECOMMAND
Function:	Primary Oven Controller On
Parameters:	ID: 17 Length: 3 Fixed Words: 17
Description:	The DEP switches power to the Primary Oven Controller On. The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Primary Oven Controller is already on to remove the DEP filter.
Mnemonic:	MBPWHPOF
Type:	BLOCK TELECOMMAND
Function:	Primary Oven Controller Off
Parameters:	ID: 17 Length: 3 Fixed Words: 18
Description:	The DEP switches power to the Primary Oven Controller Off.
Mnemonic:	MBPWHOPN
Type:	BLOCK TELECOMMAND
Function:	Optics Package Heater On
Parameters:	ID: 17 Length: 3 Fixed Words: 19
Description:	The DEP switches power to the Optics Package Heater On. The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Optics Package Heater is already on to remove the DEP filter.
Mnemonic:	MBPWHOPF
Type:	BLOCK TELECOMMAND
Function:	Optics Package Heater Off
Parameters:	ID: 17 Length: 3 Fixed Words: 1A
Description:	The DEP switches power to the Optics Package Heater Off.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBPWLTON
Type: BLOCK TELECOMMAND
Function: Limb Tracker On
Parameters: ID: 17 Length: 3 Fixed Words: 1B
Description: The DEP switches power to the Limb Tracker On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Limb Tracker is already on to remove the DEP filter.

Mnemonic: MBPWLTOF
Type: BLOCK TELECOMMAND
Function: Limb Tracker Off
Parameters: ID: 17 Length: 3 Fixed Words: 1C
Description: The DEP switches power to the Limb Tracker Off.

Mnemonic: MBPWSHON
Type: BLOCK TELECOMMAND
Function: Shutter On
Parameters: ID: 17 Length: 3 Fixed Words: 1D
Description: The DEP switches power to the Shutter On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Shutter is already on to remove the DEP filter.

Mnemonic: MBPWSHOF
Type: BLOCK TELECOMMAND
Function: Shutter Off
Parameters: ID: 17 Length: 3 Fixed Words: 1E
Description: The DEP switches power to the Shutter Off.

Mnemonic: MBPWM1ON
Type: BLOCK TELECOMMAND
Function: Michelson Tuning Motor 1 On
Parameters: ID: 17 Length: 3 Fixed Words: 1F
Description: The DEP switches power to the Michelson Tuning Motor 1 On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Michelson Tuning Motor 1 is already on to remove the DEP filter.

Mnemonic: MBPWM1OF
Type: BLOCK TELECOMMAND
Function: Michelson Tuning Motor 1 Off
Parameters: ID: 17 Length: 3 Fixed Words: 20
Description: The DEP switches power to the Michelson Tuning Motor 1 Off.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBPWM2ON
Type: BLOCK TELECOMMAND
Function: Michelson Tuning Motor 2 On
Parameters: ID: 17 Length: 3 Fixed Words: 21
Description: The DEP switches power to the Michelson Tuning Motor 2 On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Michelson Tuning Motor 2 is already on to remove the DEP filter.

Mnemonic: MBPWM2OF
Type: BLOCK TELECOMMAND
Function: Michelson Tuning Motor 2 Off
Parameters: ID: 17 Length: 3 Fixed Words: 22
Description: The DEP switches power to the Michelson Tuning Motor 2 Off.

Mnemonic: MBPWC1ON
Type: BLOCK TELECOMMAND
Function: Calibration Wheel 1 On
Parameters: ID: 17 Length: 3 Fixed Words: 23
Description: The DEP switches power to the Calibration Wheel 1 On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Calibration Wheel 1 is already on to remove the DEP filter.

Mnemonic: MBPWC1OF
Type: BLOCK TELECOMMAND
Function: Calibration Wheel 1 Off
Parameters: ID: 17 Length: 3 Fixed Words: 24
Description: The DEP switches power to the Calibration Wheel 1 Off.

Mnemonic: MBPWC2ON
Type: BLOCK TELECOMMAND
Function: Calibration Wheel 2 On
Parameters: ID: 17 Length: 3 Fixed Words: 25
Description: The DEP switches power to the Calibration Wheel 2 On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Calibration Wheel 2 is already on to remove the DEP filter.

Mnemonic: MBPWC2OF
Type: BLOCK TELECOMMAND
Function: Calibration Wheel 2 Off
Parameters: ID: 17 Length: 3 Fixed Words: 26
Description: The DEP switches power to the Calibration Wheel 2 Off.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBPWPAON
Type:	BLOCK TELECOMMAND
Function:	Polarization Analyzer On
Parameters:	ID: 17 Length: 3 Fixed Words: 27
Description:	<p>The DEP switches power to the Polarization Analyzer On.</p> <p>The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Polarization Analyzer is already on to remove the DEP filter.</p>
Mnemonic:	MBPWPAOF
Type:	BLOCK TELECOMMAND
Function:	Polarization Analyzer Off
Parameters:	ID: 17 Length: 3 Fixed Words: 28
Description:	<p>The DEP switches power to the Polarization Analyzer Off.</p>
Mnemonic:	MBPWFDON
Type:	BLOCK TELECOMMAND
Function:	Front Door On
Parameters:	ID: 17 Length: 3 Fixed Words: 29
Description:	<p>The DEP switches power to the Front Door On.</p> <p>The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Front Door is already on to remove the DEP filter.</p>
Mnemonic:	MBPWFD OF
Type:	BLOCK TELECOMMAND
Function:	Front Door Off
Parameters:	ID: 17 Length: 3 Fixed Words: 2A
Description:	<p>The DEP switches power to the Front Door Off.</p>
Mnemonic:	MBPWAMON
Type:	BLOCK TELECOMMAND
Function:	Alignment Mechanism On
Parameters:	ID: 17 Length: 3 Fixed Words: 2B
Description:	<p>The DEP switches power to the Alignment Mechanism On.</p> <p>The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Alignment Mechanism is already on to remove the DEP filter.</p>
Mnemonic:	MBPWAMOF
Type:	BLOCK TELECOMMAND
Function:	Alignment Mechanism Off
Parameters:	ID: 17 Length: 3 Fixed Words: 2C
Description:	<p>The DEP switches power to the Alignment Mechanism Off.</p>

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBPWSPR1
Type: BLOCK TELECOMMAND
Function: Unused Relay 1
Parameters: ID: 17 Length: 3 Fixed Words: 2D
Description: Unused Power Converter Relay

Mnemonic: MBPWSPR2
Type: BLOCK TELECOMMAND
Function: Unused Relay 2
Parameters: ID: 17 Length: 3 Fixed Words: 2E
Description: Unused Power Converter Relay

Mnemonic: MBPWDMON
Type: BLOCK TELECOMMAND
Function: Degraded Motor Controller On
Parameters: ID: 17 Length: 3 Fixed Words: 2F
Description: The DEP switches power to the Degraded Motor Controller On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Degraded Motor Controller is already on to remove the DEP filter.

Mnemonic: MBPWDMOF
Type: BLOCK TELECOMMAND
Function: Degraded Motor Controller Off
Parameters: ID: 17 Length: 3 Fixed Words: 30
Description: The DEP switches power to the Degraded Motor Controller Off.

Mnemonic: MBPWIPON
Type: BLOCK TELECOMMAND
Function: Image Processor On
Parameters: ID: 17 Length: 3 Fixed Words: 31
Description: The DEP switches power to the Image Processor On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Image Processor is already on to remove the DEP filter.

Mnemonic: MBPWIPOF
Type: BLOCK TELECOMMAND
Function: Image Processor Off
Parameters: ID: 17 Length: 3 Fixed Words: 32
Description: The DEP switches power to the Image Processor Off.

Mnemonic: MBPWCMON
Type: BLOCK TELECOMMAND
Function: CCD Camera On
Parameters: ID: 17 Length: 3 Fixed Words: 33
Description: The DEP switches power to the CCD Camera On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this

Mnemonic: MBPWCMON <CONTINUED>

MDI TELECOMMAND DESCRIPTIONS

command when CCD Camera is already on to remove the DEP filter.

Mnemonic: MBPWCMOF
Type: BLOCK TELECOMMAND
Function: CCD Camera Off
Parameters: ID: 17 Length: 3 Fixed Words: 34
Description: The DEP switches power to the CCD Camera Off.

Mnemonic: MBPWTM2O
Type: BLOCK TELECOMMAND
Function: Select Telemetry Unit 2
Parameters: ID: 17 Length: 3 Fixed Words: 35
Description: Switch power to High Rate Telemetry Interface 1. Only one of the 2 interface unit can be powered at any time. Behavior of the Image processor as a result of the switch may be unpredictable, and thus the IP may require initialization.

Mnemonic: MBPWTM1O
Type: BLOCK TELECOMMAND
Function: Select Telemetry Unit 1
Parameters: ID: 17 Length: 3 Fixed Words: 36
Description: Switch power to High Rate Telemetry Interface 2. Only one of the 2 interface unit can be powered at any time. Behavior of the Image processor as a result of the switch may be unpredictable, and thus the IP may require initialization.

Mnemonic: MBPWHRON
Type: BLOCK TELECOMMAND
Function: Redundant Oven Controller On
Parameters: ID: 17 Length: 3 Fixed Words: 37
Description: The DEP switches power to the Backup Oven Controller On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when Backup Oven Controller is already on to remove the DEP filter.

Mnemonic: MBPWHROF
Type: BLOCK TELECOMMAND
Function: Redundant Oven Controller Off
Parameters: ID: 17 Length: 3 Fixed Words: 38
Description: The DEP switches power to the Backup Oven Controller Off.

Mnemonic: MBPWHCMN
Type: BLOCK TELECOMMAND
Function: CCD Camera Heater On
Parameters: ID: 17 Length: 3 Fixed Words: 39
Description: The DEP switches power to the CCD Camera Heater On.
The DEP can not sense the state of the power system relays. The DEP filters commands to the electronics such that no commands are sent to devices that are off. Therefore, in some cases, one must send this command when CCD Camera Heater is already on to remove the DEP

Mnemonic: MBPWHCMN <CONTINUED>
filter.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBPWHCMF
Type: BLOCK TELECOMMAND
Function: CCD Camera Heater Off
Parameters: ID: 17 Length: 3 Fixed Words: 3A
Description: The DEP switches power to the CCD Camera Heater Off.

Mnemonic: MBLTXOFS
Type: BLOCK TELECOMMAND
Function: Limb Tracker X Offset
Parameters: ID: 18 Length: 4 Fixed Words: 00
Description: The Limb Tracker X Offset essentially controls the null point of the X-axis limb sensors. The X-axis parallel to the plane defined by the leg attachment points. The range is -5V to +5V on fine scale and -10V to +10V on coarse scale.

Mnemonic: MBLTYOFS
Type: BLOCK TELECOMMAND
Function: Limb Tracker Y Offset
Parameters: ID: 18 Length: 4 Fixed Words: 01
Description: The Limb Tracker Y Offset essentially controls the null point of the X-axis limb sensors. The X-axis perpendicular to the plane defined by the leg attachment points. The range is -5V to +5V on fine scale and -10V to +10V on coarse scale.

Mnemonic: MBLTAOFS
Type: BLOCK TELECOMMAND
Function: Limb Tracker PZT A Offset
Parameters: ID: 18 Length: 4 Fixed Words: 02
Description: The Limb Tracker PZT A offset controls the extension of the PZT in the presence of a 0 error signal. The digital range (0 - 127) corresponds to 0 to 80 volts. The nominal value should be mid-range.

Mnemonic: MBLTBOFS
Type: BLOCK TELECOMMAND
Function: Limb Tracker PZT B Offset
Parameters: ID: 18 Length: 4 Fixed Words: 03
Description: The Limb Tracker PZT B offset controls the extension of the PZT in the presence of a 0 error signal. The digital range (0 - 127) corresponds to 0 to 80 volts. The nominal value should be mid-range.

Mnemonic: MBLTCOFS
Type: BLOCK TELECOMMAND
Function: Limb Tracker PZT C Offset
Parameters: ID: 18 Length: 4 Fixed Words: 04
Description: The Limb Tracker PZT C offset controls the extension of the PZT in the presence of a 0 error signal. The digital range (0 - 127) corresponds to 0 to 80 volts. The nominal value should be mid-range.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBLTXGN
Type: BLOCK TELECOMMAND
Function: Limb Tracker X Gain
Parameters: ID: 18 Length: 4 Fixed Words: 05
Description: The Limb Tracker X Gain controls the response of the close loop system to X error signals. The digital range (0 - 255) corresponds to gains from .4 - 100.

Mnemonic: MBLTYGN
Type: BLOCK TELECOMMAND
Function: Limb Tracker Y Gain
Parameters: ID: 18 Length: 4 Fixed Words: 06
Description: The Limb Tracker Y Gain controls the response of the close loop system to Y error signals. The digital range (0 - 255) corresponds to gains from .4 - 100.

Mnemonic: MBLTOPNL
Type: BLOCK TELECOMMAND
Function: Limb Tracker Open Loop
Parameters: ID: 18 Length: 4 Fixed Words: 07 01
Description: This command disables the closed loop pointing control system.

Mnemonic: MBLTCLSL
Type: BLOCK TELECOMMAND
Function: Limb Tracker Close Loop
Parameters: ID: 18 Length: 4 Fixed Words: 07 81
Description: This command enables the closed loop pointing control system. All pertinent system parameters, e.g., gains, offsets, etc., must be set prior to closing the loop.

Mnemonic: MBLTHIGN
Type: BLOCK TELECOMMAND
Function: Limb Tracker High Gain
Parameters: ID: 18 Length: 4 Fixed Words: 07 02
Description: The Limb Tracker preamplifier is set to high gain for testing the system using the stimulus telescope as the light source.

Mnemonic: MBLTLOGN
Type: BLOCK TELECOMMAND
Function: Limb Tracker Low Gain
Parameters: ID: 18 Length: 4 Fixed Words: 07 82
Description: The Limb Tracker preamplifier is set to low gain during normal operations, i.e., when the light source is the sun.

Mnemonic: MBLTPDIO
Type: BLOCK TELECOMMAND
Function: Limb Tracker Prime Diodes
Parameters: ID: 18 Length: 4 Fixed Words: 07 04
Description: The Limb Tracker system has 2 sets of limb sensing diodes. This command selects the set designated as prime.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBLTRDIO
Type:	BLOCK TELECOMMAND
Function:	Limb Tracker Redundant Diodes
Parameters:	ID: 18 Length: 4 Fixed Words: 07 84
Description:	The Limb Tracker system has 2 sets of limb sensing diodes. This command selects the set designated as redundant.
Mnemonic:	MBLTPOUT
Type:	BLOCK TELECOMMAND
Function:	Limb Tracker Prime Outputs
Parameters:	ID: 18 Length: 4 Fixed Words: 07 08
Description:	THIS COMMAND IS NO LONGER USED.
Mnemonic:	MBLTROUT
Type:	BLOCK TELECOMMAND
Function:	Limb Tracker Redundant Outputs
Parameters:	ID: 18 Length: 4 Fixed Words: 07 88
Description:	THIS COMMAND IS NO LONGER USED.
Mnemonic:	MBLTCOAR
Type:	BLOCK TELECOMMAND
Function:	Limb Tracker Coarse Offset Scale
Parameters:	ID: 18 Length: 4 Fixed Words: 07 10
Description:	In coarse offset scale, MBLTXOFS and MBLTYOFS are scaled to -10V to +10V, i.e., the range of the offset is +/- 120 arc seconds.
Mnemonic:	MBLTFINE
Type:	BLOCK TELECOMMAND
Function:	Limb Tracker Fine Offset Scale
Parameters:	ID: 18 Length: 4 Fixed Words: 07 90
Description:	In fine offset scale, MBLTXOFS and MBLTYOFS are scaled to -5V to +5V, i.e., the range of the offset is +/- 60 arc seconds.
Mnemonic:	MBSQSTR
Type:	BLOCK TELECOMMAND
Function:	Start DEP Sequence
Parameters:	ID: 19 Length: 4 Fixed Words: 00
Description:	This command causes the DEP Sequence Control Routine to begin execution at the address specified by the parameter. The address is an offset into the control routine's sequence list buffer. The sequence begins immediately. If another sequence had been it is terminated. The DEP does not check that the specified address is at the start of a sequence, so the responsibility for the integrity of the address rests with the ground based operations. When in sequence mode, the DEP will not execute image taking telecommands, e.g. MBCMTP1, etc.
Mnemonic:	MBSQEND
Type:	BLOCK TELECOMMAND
Function:	Stop DEP Sequence
Parameters:	ID: 19 Length: 3 Fixed Words: 01
Description:	Terminate the current sequence. The DEP Sequence Control Routine stops executing immediately.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBSQREG
Type:	BLOCK TELECOMMAND
Function:	Set DEP Sequence Register
Parameters:	ID: 19 Length: 5 Fixed Words: 02
Description:	<p>Set a DEP Sequence Register to a specified value. The first parameter specifies the register (0-15) and the second parameter the value.</p> <p>This command supplies a mechanism by which one can interact with running sequences in a synchronous fashion. Sequences include instruction that operate with registers. By writing sequences that use registers in a well defined manner, one can force changes in the behavior of sequences at times that are consistent with maintaining the rigid cadence required for the SOI investigation.</p>
Mnemonic:	MBSQDEVC
Type:	BLOCK TELECOMMAND
Function:	Set DEP Device Control Parameter
Parameters:	ID: 19 Length: 5 Fixed Words: 03
Description:	<p>Set a DEP Device Control Parameter. This command determines action taken by device configuration telecommands and in sequences if default direction or image size is requested; i.e. it controls the defaults.</p> <p>Without using this command, defaults are always the last explicitly specified value.</p> <p>First parameter defines the device: 0=MTM1;1=MTM2;2=SHUTTER;4=PAW;7=CAL1;8=CAL1</p> <p>Second parameter is the control word. For devices other than shutter: 0 = clockwise; 1 = counter-clockwise</p> <p>For device 4 (Shutter): 0=1x (Full Disk); 1=3X (High Resolution)</p>
Mnemonic:	MBSQIPC
Type:	BLOCK TELECOMMAND
Function:	Set IP Control Parameters
Parameters:	ID: 19 Length: 15 Fixed Words: 04
Description:	<p>Set the image processor control block. The lower eight bits in each of ten parameter specify the 10 bytes to be sent to the CCD camera for DMA, APU, and High rate telemetry control. The format of the IP control is defined in MDI330037.</p> <p>NOTE: THIS COMMAND DUPLICATES MBCMHDR!.... IS IT NECESSARY?</p>
Mnemonic:	MBSQMTMO
Type:	BLOCK TELECOMMAND
Function:	Set the MTM offset
Parameters:	ID: 19 Length: 5 Fixed Words: 05
Description:	<p>Load the offset for the MTMs. The offsets are for tweaking the MTM tuning. The offsets allow one to make changes in the absolute positioning of the MTM's in DEP and telecommand sequences without changing those sequences.</p> <p>Two parameters words specify offsets for MTM 1 and 2 respectively. The offsets by MBDFCONF and by sequencer device configuration functions. Direct Device Commands, i.e., MBM1SP and MBM2SP do not use these offsets.</p>

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBSQCONS
Type: BLOCK TELECOMMAND
Function: Configure when shutter closed
Parameters: ID: 19 Length: 3 Fixed Words: 06
Description: DEP Sequencer executes CON functions as soon as shutter is closed. The DEP Sequence Control Routine can configure electromechanical devices at shutter close time of readout complete time. This command selects the former. In this mode, there is more time for the devices reach their commanded positions; however, in this mode, device motions occur during the readout and may thus insert some additional noise on the camera signal.

Mnemonic: MBSQCONR
Type: BLOCK TELECOMMAND
Function: Configure when readout complete
Parameters: ID: 19 Length: 3 Fixed Words: 07
Description: DEP Sequencer executes conf functions when readout is complete. The DEP Sequence Control Routine can configure electromechanical devices at shutter close time of readout complete time. This command selects the later. In this mode, there is less time for the devices reach their commanded positions; however, in this mode, device motions do not coincide with the camera readout and the camera signal may have less noise.

Mnemonic: MBSQMTLU
Type: BLOCK TELECOMMAND
Function: Load MTM Lookups
Parameters: ID: 19 Length: Variable Fixed Words: 08
Description: Load MTM lookup table entries. The DEP Sequence Control Routine can command the MTM's either directly by specified position or indirectly though lookup tables. The lookup tables supply a mechanism by which the sequence writer can refer to standard positions, having little concern for the actual encoder value required to realize those positions.
First parameter is lookup table version number This number is echoed in housekeeping TM and should be used by ground software to supply knowledge of the lookup table values in use at any given time.
Additional parameters are triplets in the form:
Entry Number (0-44); MTM1 position;MTM2 position.

Mnemonic: MBSQEPHM
Type: BLOCK TELECOMMAND
Function: Set Ephemeris Parameters
Parameters: ID: 1A Length: 24 Fixed Words: 00
Description: Loads a set of ephemeris parameters
Next 3 words contain a reference time (LOBT format)
Next 6 words contain B0 Fit parameters
Next 6 words contain P Fit parameters
Next 6 words contain R Fit parameters
NOTE:
IS THIS COMMAND STILL REALLY NEEDED.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBDMSTEP
Type: BLOCK TELECOMMAND
Function: Issue DMC Motor Step
Parameters: ID: 1B Length: 5 Fixed Words: None
Description: Commands a motor to a state using the Degarded Motor Controller (DMC)
Second word is motor identifier, third is location.
Additional command mnemonics may be added later.

Mnemonic: MBHPOSPT
Type: BLOCK TELECOMMAND
Function: Prime Oven Heater Set Point
Parameters: ID: 1C Length: 5 Fixed Words: 00 00
Description: Set the Prime Oven Heater Controller set point. The Prime Oven
Controller is a closed loop system. The DEP commands it to a given
set point and the controller electronics maintains the oven temperature.
Set point 0 is 34 degrees Celsius, 1 is 35, and so forth.

Mnemonic: MBHPOMTW
Type: BLOCK TELECOMMAND
Function: Prime Oven Time Window
Parameters: ID: 1C Length: 5 Fixed Words: 00 01
Description: Set the time from prime oven failure detection to switch off. If DEP
Prime Oven Monitoring is enabled and the DEP detects an Oven Controller
failure that persists for longer than the specified duration, the
Prime Oven Heater Power is switched off. The parameter specifies
The time duration in minutes.
Detailed DEP thermal requirements are defined in MD340008.

Mnemonic: MBHPOMON
Type: BLOCK TELECOMMAND
Function: Prime Oven Monitoring On
Parameters: ID: 1C Length: 4 Fixed Words: 00 02
Description: Activates the prime oven monitoring software. All monitoring
parameters should be set prior to sending this command.
Detailed DEP thermal requirements are defined in MD340008.

Mnemonic: MBHPOMOF
Type: BLOCK TELECOMMAND
Function: Prime Oven Monitoring Off
Parameters: ID: 1C Length: 4 Fixed Words: 00 03
Description: Deactivates the prime oven monitoring software.

Mnemonic: MBHROSPT
Type: BLOCK TELECOMMAND
Function: Backup Oven Set Point
Parameters: ID: 1C Length: 5 Fixed Words: 01 00
Description: Set the backup oven heater controller set point. The parameter is the
set point (0-255).
Detailed DEP thermal requirements are defined in MD340008.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic:	MBHROMDB
Type:	BLOCK TELECOMMAND
Function:	Backup Oven Dead Band
Parameters:	ID: 1C Length: 6 Fixed Words: 01 01
Description:	If Backup Oven monitoring is on, and the temperature indicated by MTOPTS4 is within the limits specified by the dead band, the DEP takes no action. The first parameter is the low limit of the dead band while the second parameter is the high limit. The parameter units are digitized temperature. Detailed DEP thermal requirements are defined in MD340008.
Mnemonic:	MBHROMCB
Type:	BLOCK TELECOMMAND
Function:	Backup Oven Control Band
Parameters:	ID: 1C Length: 6 Fixed Words: 01 02
Description:	If backup oven monitoring is on, and the temperature indicated by MTOPTS4 is within the control band by outside the dead band, the DEP will adjust the control voltage by one count, i.e. the DEP raises the voltage if the temperature is below the low dead band limit and lowers the voltage if it is above the high dead band limit. The first parameter is the low limit of the control band and the second is the high limit. The parameter units are digitized temperature. Detailed DEP thermal requirements are defined in MD340008.
Mnemonic:	MBHROMON
Type:	BLOCK TELECOMMAND
Function:	Backup Oven Monitoring On
Parameters:	ID: 1C Length: 4 Fixed Words: 01 03
Description:	This command enables backup oven control. When enabled, the DEP adjusts the backup heater controller set point based on temperature of MTOPTS4 relative to the dead band and control band. If the temperature is outside the control band, the DEP sets the backup oven either full on or full off. See MBHROMDB and MBHROMCB for DEP actions when the temperature is in band. Detailed DEP thermal requirements are defined in MD340008.
Mnemonic:	MBHROMOF
Type:	BLOCK TELECOMMAND
Function:	Backup Oven Monitoring Off
Parameters:	ID: 1C Length: 4 Fixed Words: 01 04
Description:	This command disable backup oven control. Second word is 4
Mnemonic:	MBHOPSPT
Type:	BLOCK TELECOMMAND
Function:	OP Heater Set Point
Parameters:	ID: 1C Length: 5 Fixed Words: 02 00
Description:	This command specifies a set point at which to operate the optics package heaters. The lower 6 bits are the value sent to a variable heater, while each of the next 2 bits control fixed heaters. The fixed heaters are either on(1) or off(0). Each fixed heater is equivalent to the variable heater at full on.

MDI TELECOMMAND DESCRIPTIONS

Mnemonic: MBOVNMAX
Type: BLOCK TELECOMMAND
Function: Maximum Oven Temperature
Parameters: ID: 1C Length: 5 Fixed Words: 03 00
Description: This command specifies the maximum allowed temperature of the oven. If prime oven monitoring is enabled and this temperature is exceeded, for (TBD) consecutive samples, the prime oven heater will be powered off. The backup oven heaters are not effected. The temperature is specified in digitized units.

Mnemonic: MBHCMSPT
Type: BLOCK TELECOMMAND
Function: CCD Heater Set Point
Parameters: ID: 1C Length: 5 Fixed Words: 04 00
Description: This command specifies a set point at which to operate the variable CCD Decontamination heater. The lower 3 bit only are used. The CCD heater levels are 2.5, 5, and 10 watts controlled by command bits 0, 1, and 2 respectively.

Mnemonic: MBDPCONF
Type: BLOCK TELECOMMAND
Function: Configure the Optics
Parameters: ID: 1D Length: Variable Fixed Words: None
Description: This command configures the optical elements simultaneously. It should be used, rather than direct device commands wherever possible. The command simplifies telecommand sequences. The desired positions for 1 to 5 devices can be specified in the command. Parameters specify the specify position and control for MTM1,MTM2,PAW,C1,C2 in that order. The parameter word format is:
XYZZ: X=0 move,=1 no move;y=0 default,=1 CW,=2 CCW, ZZ=position
Examples: MBDPCONF 0x22 0x44 : M1 to 34, M2 to 68 in default direction
MBDPCONF 0x1000 0x1000 0x120 : PA clockwise to 32
The Default direction is the most recently commanded direction or the direction specified by command MBSQDEVC.